

March 12, 2004



Marlene H. Dortch
Secretary
Federal Communications Commission
TW-A325
445 Twelfth St., SW
Washington, DC 20554

Re: *Notice of Ex parte* presentation in WT Docket No. 03-66

Dear Ms. Dortch:

On March 11, 2004, Harold Feld, Associate Director, Media Access Project (MAP), and Guillian Marsais, of Rapid DSL & Wireless (RDW), met with the following members of the Wireless Telecommunications Bureau: David Furth, Associate Director, Nancy M. Zaczek, Senior Counsel, Broadband Division, Joel D. Taubenblatt, Chief, Broadband Division, Uzoma C. Onyeije, Legal Advisor, Office of the Bureau Chief. Tim Pozar, of the Bay Area Users Research Network and Bay Area Wireless Users Group (BAURN), participated by phone.

Mr. Feld began by reiterating the general support for maintaining ITFS eligibility and opposition to double-sided auctions summarized in the Comments and Reply Comments of NAF, *et al.* Mr. Feld also stated that the Commission has a responsibility to determine the highest public interest return for the spectrum rules. In this instance, where the licensees seek to completely re-write the service rules, the Commission must balance the request of the licensees against the public interest value of serving small businesses, enhancing broadband deployment, and facilitating use of the spectrum by all citizens of the United States. Accordingly, the question is not whether an underlay or reallocation is consistent with the band plan proposed by the MDS/ITFS licensees or whether MDS/ITFS licensees would enjoy the same level of flexibility and interference protection given the presence of a reallocation or an underlay. Rather, the Commission must consider whether the public interest is best served by modifying the licensees' request for billions of dollars worth of spectrum privileges for free so as to accommodate the Commission's other public interest goals.

Mr. Feld also observed that modification of the NAF, *et al.* proposal might also be appropriate. For example, if the Commission chose to extend the underlay only to the mid-band proposed by the MDS/ITFS licensees, where high-power point-to-point use makes interference least likely, that might be an acceptable compromise. Similarly, opportunistic sharing on a dynamic basis as proposed in the Cognitive Radio NOI or Interference Temperature NOI, rather than a dedicated band for unlicensed created through reallocation, might also be reasonable.

Mr. Marsais described the deployment of RDW's network. RDW provides Internet access and local networking services for small businesses and other enterprise customers throughout the Washington D.C. Metropolitan Area. ([Http://www.rapdidsl.net](http://www.rapdidsl.net)) The network uses 5.3 GHz and 5.8 GHz links for long-haul and 2.4 GHz for local networking. RDW would like to use 2.4 GHz microcells, but RDW has had to avoid use of 2.4 GHz because the lack of channel space and congestion in the band makes the 2.4 GHz band too unreliable for business customers. Access to spectrum in 2.5 GHz would greatly facilitate the deployment of RDW's services to serve small business customers and to

aggressively market to residential customers.

Mr. Pozar described the efforts of BAURN to create a wireless network throughout the San Francisco Bay area. Mr. Pozar explained that he has worked on pilot programs in economically depressed countries such as Laos and Bhutan, and has seen that, given sufficient available spectrum, unlicensed access can scale to serve large geographic regions even with existing technology.

In San Francisco, BAURN uses a 2.4 GHz path from neighborhood transmitters to a dish on Mt. St. Bruno, where an ISP handles the traffic to and from the Internet cloud. The distance is six miles, and packet loss over the stream is negligible. However, the lack of available spectrum imposes a serious constraint on the network, which apportions use in a hierarchical fashion. Because of limited amount of 2.4 spectrum available, only a limited number of people can be connected to Mt. St. Bruno at a time.

Neighborhoods cannot get access to DSL or cable backhaul because most residential and small business acceptable use policies prohibit subscribers from providing neighborhood networks. At the ground level in neighborhoods, the network experiences further congestion because of the large number of devices using the 2.4 GHz band. Access to space in 2.5 would greatly increase the number of users that could use the backhaul to Bruno and the ability to adjust dynamically to interference at the ground level.

Discussion of these interference issues and coverage maps for the BAURN/BAWG network are available at <http://www.lns.com/papers/part15>, and <http://www.baurn.org>

Mr. Furth asked whether a sectorized or phased array antenna would help BAURN's network. Mr. Pozar answered that (a) most of the city of San Francisco would be a single sector, minimizing the usefulness of a sectorized antenna, and (b) phased array has problems in deployment. There are also cost issues for a network provided free or cheap to the public. Real relief requires access to additional, useful spectrum, rather than new antenna rules or new power rules such as those contemplated in ET 03-201.

Mr. Furth asked why additional spectrum needed to come from 2.5. Given the use of frequency hopping to maximize efficiency, why couldn't users hop to spectrum above 5 GHz on a dynamic basis?

Mr. Marsais and Mr. Pozar explained that additional spectrum must be close to the spectrum being used. To hop from 2.4 GHz to above 5 GHz would require devices to have two separate modules sufficiently intelligent to effect hand offs to each other on an instantaneous, dynamic basis. This would drive up cost of manufacture, power cost, and be far bulkier and more difficult to deploy. For small businesses and community based networks for whom a difference of even a few dollars per unit can have significant impact on network deployment, this additional price cost and power cost makes units that hop from 2.4 GHz to 5 GHz band unusable.

By contrast, it would require only a software modification to make existing units able to jump with a .5 GHz range. Mr. Pozar said that his experience working with local public safety users – who are seeking to adapt off the shelf 2.4 GHz technology for use in the 1.9 GHz safety band – demonstrates the .5 GHz is optimum range for frequency hopping before technical issues begin to create problems that require expensive hardware solutions.

Mr. Furth asked whether, if the Commission allocated spectrum in the band exclusively for unlicensed, the rules should simply mirror the existing 2.4 rules. Mr. Feld, Mr. Pozar and Mr. Marsais replied that the Commission should not limit uses of the spectrum, but should require that devices using the spectrum have greater intelligence built into them to avoid unnecessary interference. For example, the FCC could require 802.11H or similar protocol which automatically scales power to what is necessary to send/receive a signal. The rules should certainly encourage “intelligent design,” so that networks avoid unnecessary interference. Such rules are already under consideration in the Interference Temperature and Cognitive Radio proceedings, and in ET 03-201. Such design requirements are already encouraged by 47 CFR §15.247, and are consistent with 47 USC §324 and 47 USC §333. All parties stressed that the FCC’s rules should be technologically agnostic and refrain from mandating any specific technology or protocol. Rather, the FCC should set standards that create an environment in which the technology can evolve dynamically.

Mr. Furth asked what would be the greatest advantage of an exclusive allocation. The parties replied that it would allow increases in power and the ability to experiment without fear of interfering with a licensed service. Mr. Furth asked how much of a power increase would make a difference. Mr. Pozar opined that an increase of 10-watts would make a huge difference for deployment in urban settings and, when used in combination with intelligent design principles, would not interfere with licensed services in neighboring bands. All agreed that power levels could be increased further in rural areas if devices were intelligent.

Mr. Furth asked what rules should be included in an underlay. The parties suggested that both the unlicensed and the licensed services should be required to use sufficiently intelligent devices so that they can adjust signal strength dynamically to avoid unnecessary interference. Mr. Pozar observed that this principle was already used in European cell phones to avoid interference among licensed devices. Mr. Pozar also suggested that concerned licensees could use an FM-type modulation, which is more robust, to avoid possible interference. Finally, Mr. Pozar observed that voluntary frequency coordination committees have already emerged on a voluntary basis to coordinate deployment of infrastructure using unlicensed spectrum. While no one proposed mandating such committees, the parties anticipate that users of unlicensed 2.5 GHz spectrum would coordinate with licensed users of 2.5 GHz spectrum to avoid any interference. Even if such coordinating committees did not emerge, the history of deployment in the existing bands demonstrates that parties will work together and will employ new technologies to minimize interference.

In accordance with Section 1.1206(b), 47 C.F.R. § 1.1206, this letter is being filed electronically with your office today.

Respectfully submitted

Harold Feld
Associate Director
Media Access Project

cc: David Furth
Uzoma C. Onyeije
Joel D. Taubenblatt
Nancy M. Zaczek